B. Tech.

(SEM. IV) EXAMINATION. 2006-07

ADVANCE SURVEYING

Time : 3 Hours] [Total Marks : 100

Note : (1) Attempt all questions.
(2) Assume data suitably, if not given.

1 Attempt any four parts of the following : 5×4=20

a) What are different types of alidades? Discuss the use of Telescopic alidade.

b) Describe the procedure for setting up a plane table over a station.

c) What is orientation? What are different methods of orientation of a plane table.

d) Discuss the method of drawing contours using plane table survey.

e) What are different types of errors in plane table surveying? How would you minimize them?

f) Describe Lehmann’s rules with the help of neat sketches.
2 Attempt any **four** parts of the following : \[5 \times 4 = 20\]
   a) Differentiate between :
      (i) Triangulation and traversing.
      (ii) Triangulation and trilateration.
   b) What is meant by strength of figure? How would you determine it?
   c) What is extension of base? How is it done?
   d) Discuss the various correction for base line in brief.
   e) What is satellite station? How would you reduce the horizontal angles?
   f) A 30 m tape standardized in catenaries as 29.990 m at 100 n is used in the field with a tension of 80 N in catenary. Calculate the sag correction of the mass of the tape is 0.03 kg/m.

3 Attempt any **two** parts of the following : \[10 \times 2 = 20\]
   a) i) Explain the method correlates. What are its advantages over the normal equation method?
      ii) How would you adjust a level line circuit?
   b) Directions are observed from a satellite station 200 m from station C with the following results :
      \[A = 00^\circ \ 00' \ 00''\]
      \[B = 62^\circ \ 15' \ 24''\]
      \[C = 280^\circ \ 20' \ 12''\]
      The approximate lengths of AC and BC are 25,200 m and 35,000 m respectively. Calculate the angle ACB.
c) Prove by least square method, if the observations of a quantity are in correlated and of different weights, the most probable value of the quantity is the weighted arithmetic mean of the observations.

4 Attempt any **four** parts of the following :  \(5 \times 4 = 20\)

a) What are different methods of designation of a curve? Derive a relationship between the radius and the degree of curve.

b) How would you select a suitable peg interval for a circular curve? What do you understand by unit chord and sub-chord?

c) What is a reverse curve? Give various relationships between various elements of a reverse curve.

d) Determine the ordinates of the points on a circular curve having a long chord of 100 m and versed sine of 5 m. The ordinates are to be measured from the long chord at an interval of 10m.

e) What are the basic criteria for the design of a transition curve? Derive an expression for super-elevation. What are the advantages of transition curve?

f) Derive an equation of a vertical curve in term of two gradients and length of the curve.

5 Attempt any **two** parts of the following :  \(10 \times 2 = 20\)

a) Explain the salient features of route surveying of a canal. How does this differ from that of a highway?
b) i) Find the azimuth and the hour angle of the sun at sunset for a place of latitude 49°, its declination being given to be 19°S.

ii) Explain celestial latitude and longitude co-ordinate system with neat sketch.

c) Explain the following term with the help of neat sketches:

i) First point of arise
ii) Equinoctial points
iii) Right Ascension
iv) Hour angle
v) Celestial and observer’s meridian.